Draft Existing Use Determination and Rationale:

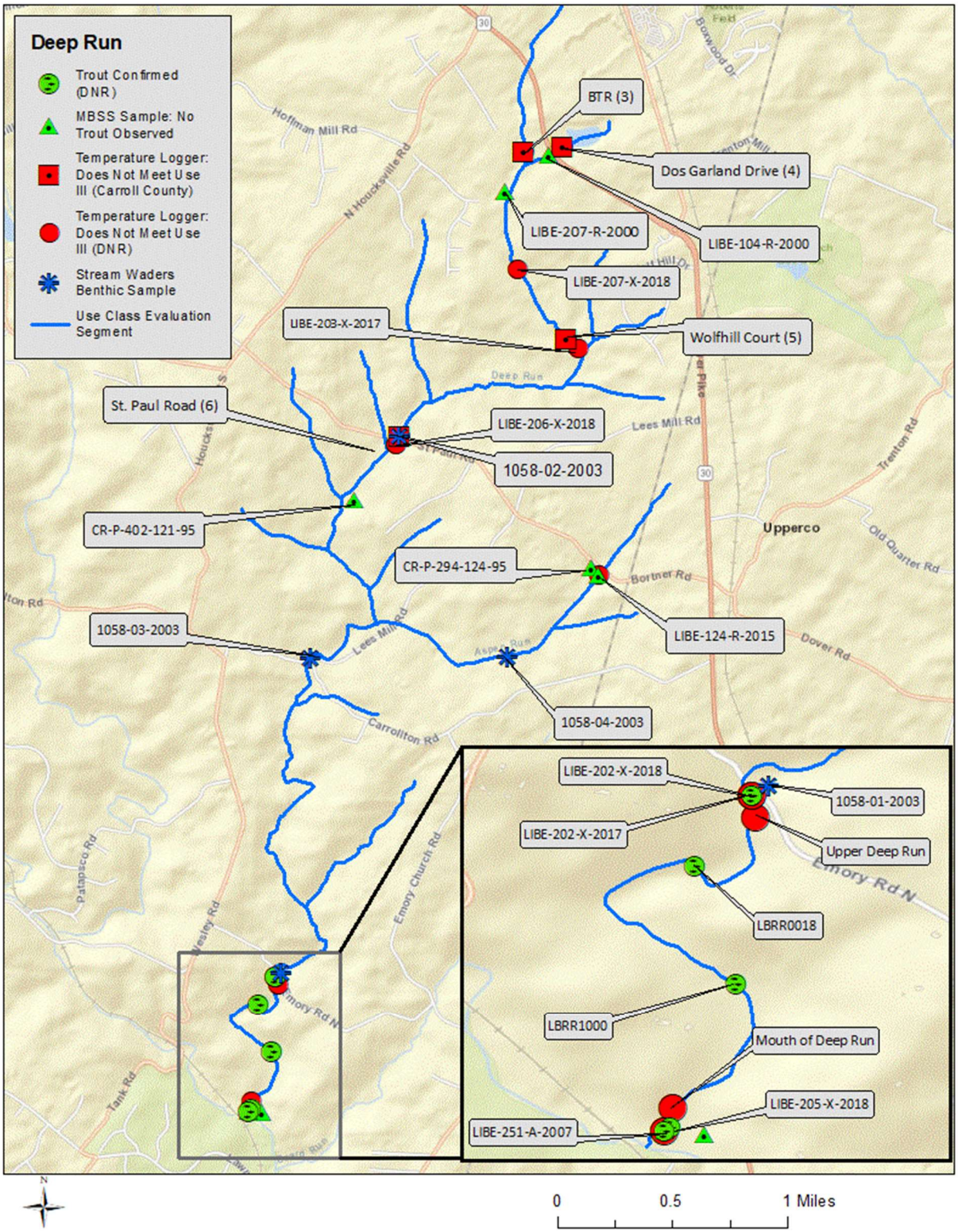
Deep Run (Baltimore and Carroll Counties)

April 20, 2020

Description of Setting and Data Sources

Deep Run (12-digit 021309071048) is a Use Class I-P tributary to the North Branch Patapsco River located southwest of Hampstead, MD. Carroll County, MDDNR Fisheries and MBSS Programs, and Stream Waders volunteers conducted surveys along Deep Run. The figure below shows the location of Deep Run along with the relevant sampling stations. Tables 1 and 2, provide a summary of water temperature and trout species information.

Figure 1. Deep Run



Temperature Data Summary for Deep Run

Water temperature data were collected at 20 sampling events conducted in the Deep Run stream system. Of these 20, all but one was located in the main stem. None of the stations sampled have water temperature results that meet the Class III criterion.

Temperature data from various parts of Deep Run exhibited a lot of variability. The average daily mean of sampling events ranged from 17.96°C to 23.34°C. The daily max ranged from 22.6°C to 31.31°C. The five sampling events located in the most downstream section of the Deep run stream system have a smaller range of average daily mean temperatures (19.7°C to 20.39°C).

The Carroll County temperature logger station BTR (3) seemed to have two "outlier" years (2016 and 2018), with percent greater than 24°C being 34% and 28% respectively. The data taken from the BTR (3) station in 2017 exceeded 24°C only 2% of the time. When considering the other logger stations in this segment, the maximum percentage of time that 24°C was exceeded was only 7% of the time.

If these two outlier years are not considered, then all temperature loggers achieved an average daily mean of below 20.5°C, a daily max below 32°C, and maintained temperatures at or below 24°C at least 93% of the time.

Table 1. Deep Run Water Temperature Logger Data

Date	Station ID	Stream	DATA Submitter	# Temp Readings	Percent>20°C	Percent>24°C	Avg Daily Mean	Daily Max
2018	St. Paul Road (6)	Deep Run	Carroll County	4416	48%	0%	19.78	24.36
2017	St. Paul Road (6)	Deep Run	Carroll County	4416	55%	1%	20.03	24.61
2016	St. Paul Road (6)	Deep Run	Carroll County	4416	66%	5%	20.79	25.74
2018	BTR (3)	Deep Run	Carroll County	4416	96%	34%	23.34	29.77
2017	BTR (3)	Deep Run	Carroll County	4414	19%	2%	17.96	26.72
2016	BTR (3)	Deep Run	Carroll County	4416	36%	28%	19.57	30.8
2017	Dos Garland Dr. (4)	Deep Run	Carroll County	4416	35%	0%	19.13	24.41
2016	Dos Garland Dr. (4)	Deep Run	Carroll County	4416	48%	1%	19.85	26.18
2018	Wolfhill Court (5)	Deep Run	Carroll County	4416	57%	2%	19.78	25.14

Date	Station ID	Stream	DATA Submitter	# Temp Readings	Percent>20°C	Percent>24°C	Avg Daily Mean	Daily Max
2017	Wolfhill Court (5)	Deep Run	Carroll County	4416	62%	2%	20.44	25.19
2016	Wolfhill Court (5)	Deep Run	Carroll County	4416	75%	7%	21.27	25.6
2015	Upper Deep Run	Deep Run	MDDNR Fisheries Program	1929	71%	1%	20.2	25.14
2014	Mouth of Deep Run	Deep Run	MDDNR Fisheries Program	5355	42%	0%	19.7	31.31
2018	LIBE-202-X-2018	Deep Run	MDDNR MBSS	6449	61%	1%	20.21	23.43
2018	LIBE-205-X-2018	Deep Run	MDDNR MBSS	-	-	-	-	-
2018	LIBE-206-X-2018	Deep Run	MDDNR MBSS	6624	50%	0.3%	19.87	22.65
2018	LIBE-207-X-2018	Deep Run	MDDNR MBSS	6624	57%	4%	20.46	23.94
2017	LIBE-202-X-2017	Deep Run	MDDNR MBSS	6624	63%	1%	20.39	24.24
	LIBE-203-X-2017	Deep Run	MDDNR MBSS	6624	63%	3%	20.48	25.28
2015	LIBE-124-R-2015	Aspen Run tributary to Deep Run	MDDNR MBSS	6624	21%	0%	18.82	22.6
2007	LIBE-251-A-2007	Deep Run	MDDNR MBSS	6624	56%	2%	20.25	26.09
2000	LIBE-207-R-2000	Deep Run	MDDNR MBSS	-	-	-	-	-
	LIBE-104-R-2000	Deep Run	MDDNR MBSS	-	-	-	-	-
1995	CR-P-402-121-95	Deep Run	MDDNR MBSS	-	-	-	-	-

Date	Station ID	Stream	DATA Submitter	# Temp Readings	Percent>20°C	Percent>24°C	Avg Daily Mean	Daily Max
	CR-P-294-124-95	Aspen Run tributary to Deep Run	MDDNR MBSS	-	-	-	-	-

*Water temperature logger and instantaneous YSI flowtracker data were assessed from June to August. The "Daily Max" represents the maximum temperature from June to August. Temperature loggers were not deployed for MDDNR MBSS round 1 (1994-1997). Carroll County provided data for 2015 but not for June/July/August.

Biological Data Summary for Deep Run

Multiple year classes including young-of-year brown trout were found at 6 sampling locations (Level 3 data) where trout populations were identified. All of these sampling stations are located at the most downstream section of Deep Run. The MDDNR Fisheries Program did not attempt to collect coldwater obligate benthic macroinvertebrate species, and MDDNR MBSS sampling events did not yield any coldwater obligate benthic macroinvertebrate species.

There were 4 MDDNR Stream Waders sampling events (Level 2 data) that occurred in 2003 which are not shown on Table 2. These sampling events did not yield any coldwater obligate benthic macroinvertebrate species. Unless otherwise noted, benthic data submitted by MDDNR Stream Waders was identified to family level.

Table 2. Deep Run Biological Data

Date	Station ID	Stream	Data Submitter	Species	Count	Maturity
7/15/2015	LBRR0018	Deep Run	MDDNR Fisheries Program	brown trout	5	Multiple Year Classes with YOY
9/15/2014	LBRR1000	Deep Run	MDDNR Fisheries Program	brown trout	6	Multiple Year Classes with YOY
6/20/2018	LIBE-202-X-2018	Deep Run	MDDNR MBSS	brown trout	6	Multiple Year Classes of Adults
6/20/2018	LIBE-205-X-2018	Deep Run	MDDNR MBSS	brown trout	2	Multiple Year Classes of Adults
8/29/2018	LIBE-206-X-2018	Deep Run	MDDNR MBSS	-	-	-
6/21/2018	LIBE-207-X-2018	Deep Run	MDDNR MBSS	-	-	-
7/20/2017	LIBE-202-X-2017	Deep Run	MDDNR MBSS	brown trout	7	Multiple Year Classes with YOY
7/18/2017	LIBE-203-X-2017	Deep Run	MDDNR MBSS	-	-	-
7/19/2007	LIBE-251-A-2007	Deep Run	MDDNR MBSS	brown trout	4	Multiple Year Classes with YOY

Date	Station ID	Stream	Data Submitter	Species	Count	Maturity
7/6/2015	LIBE-124-R-2015	Aspen Run tributary to Deep Run	MDDNR MBSS	-	-	-
6/20/2000	LIBE-207-R-2000	Deep Run	MDDNR MBSS	-	-	-
6/20/2000	LIBE-104-R-2000	UT1 Deep Run	MDDNR MBSS	-	-	-
8/7/1995	CR-P-402-121-95	Deep Run	MDDNR MBSS	-	-	-
6/13/1995	CR-P-294-124-95	Aspen Run tributary to Deep Run	MDDNR MBSS	-	-	-
4/12/2003	1058-04-2003	Aspen Run tributary to Deep Run	MDDNR Stream Waders	-	-	-
4/12/2003	1058-03-2003	Deep Run	MDDNR Stream Waders	-	-	-
4/12/2003	1058-01-2003	Deep Run	MDDNR Stream Waders	-	-	-

*YOY – young-of-year

DNR Fish Stocking

Maryland DNR has stated that the Freshwater Fisheries program has not stocked the North Branch of the Patapsco River upstream of the Liberty Reservoir since at least 1988. Records of stocking before this time may be unavailable, but the reproducing trout populations in this segment are not the result of recent stocking.

Existing Use Determination and Rationale

Current Use Class: Class I-P

Existing Use Determination: Deep Run, from its confluence with the North Branch Patapsco River to the confluence with an unnamed tributary located at [39.539074° N, -76.872774° W], supports naturalized self-sustaining brown trout (*Salmo trutta*) and water temperatures that have an average daily mean below 20.5°C, daily maximum below 26.5°C, stay below 24°C at least 90% of the time and stay below 20°C at least 37% of the time (Figure 2).

Is this Existing Use Determination Consistent with the Currently (March 2020) Designated Use Class: **No**. The existing use of Deep Run as described above, requires that water temperatures remain significantly colder than the water quality criterion established to protect the current use class (Class I-P) designation. As a result, this existing use of Deep Run requires protections to maintain the colder water temperatures currently found in Deep Run and different than those afforded by the current use class designation of I-P.

Changes Proposed to the Current Designated Use Class: Though it is clear that the designated use class of Deep Run should be revised to reflect and be protective of the existing use, current temperature data do not support the re-designation of Deep Run to Class III-P without conducting a use attainability analysis (UAA). Since Maryland is in the process of redefining Class IV/IV-P and potentially developing a new 'cool water' use class as part of the work of the Cold Water Advisory Committee, it is not prudent to redesignate Deep Run to Class IV-P at this time. Instead, and until Maryland conducts either a UAA or establishes new definitions for Class IV and a cool water use, MDE will formally recognize Deep Run as having an existing use requiring colder water temperature than is specified in the criterion for its current designated use class.

Rationale for the Existing Use Determination: Multiple sampling events have shown that there is a naturalized self-sustaining brown trout population located at the confluence of the North Branch Patapsco River and Deep Run. All brown trout observations in Deep Run are located in the stream mile between Emory Road and the confluence with the North Branch Patapsco River. Although not displayed in Figure 1, several North Branch Patapsco River brown trout observations also occurred directly at the confluence with Deep Run. Several MBSS samples located in the upstream reaches of Deep Run did not capture any instances of brown trout near the headwaters. Therefore, the data has not demonstrated that the naturalized self-sustaining brown trout population utilizes the habitat upstream of the first confluence. The existing use of a naturalized self-sustaining brown trout population extends from the confluence with the North Branch Patapsco to first stream confluence located approximately at [39.539074°N, -76.872774°W].

Since none of the water temperature data collected in Deep Run or the nearby portions of the North Branch Patapsco River meet the Class III temperature criterion, the State cannot justify redesignating any portion of Deep Run to Class III without further improvements in water temperature or conducting a UAA. And even though these water temperature data may support a redesignation to Use Class IV or the conceptualized 'cool water' use currently being discussed, since these uses are in flux, the State prefers to protect this stream with the protections under Tier I Antidegradation Policy until those uses are properly revised and/or developed.

Figure 2. Deep Run Existing Use Determination